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be frequently in good accordance with the plentiful results of meteor-path determinations, when further and better trials and examinations are made of them by more extensively conducted comparisons of preserved accounts of their velocities and courses.

[P.S. (to p. 189).—The exact place of the French observer's station, near Attichy and Compiègne, in Oise, now kindly communicated to me by the acting secretary, M. G. Armelin, of the French Astronomical Society, really demands a slightly greater correction than that assumed, of the real path, in the above-found direction; and this must enhance somewhat the rather considerable errors which affect the observations. But if in the mist which there prevailed and greatly impeded accuracy of reference to two glimpsed stars in *Pegasus*, the description of the meteor's path at Worthing was perhaps considerably less accurate than the clear sky projections of the track at Attichy in Oise, and at Slough in England, a rather longer, and therefore swifter path than the above computed one, could be calculated, from a radiant-point at about 351°, +6°, or 353°, +7°, for which the parabolic meteor-speeds are only 28½ or 29 miles per second; and the observed and theoretical meteor-speeds may not then have really been very materially at variance.—Note added, 1899 February 28.]

Observations of the Brightness of α Orionis, 1895–1898.

By T. W. Backhouse.

The accompanying table gives the results of observations of the brightness of *α Orionis* made at Sunderland with my naked eye, except where otherwise stated, from the beginning of 1895 to the middle of December 1898. The names of the stars with which *α Orionis* is compared are given at the tops of the columns, the number above each star being its magnitude taken from the Harvard Photometry, but in the case of ruddy stars (marked R), the magnitude is made ·22 mag. fainter, such stars appearing so much fainter to me than to the H.P. observers. Other stars observed are placed in the "Remarks" column. Columns 1 and 2 give the date and time (G.M.T.) of observation. Column 3 gives the relative atmospheric absorption. As the clearness of the atmosphere varies on different occasions, when an observation is made the apparent clearness, or assumed relative absorption, is recorded, being called 1·0 when it appears as clear as it ever is, or is likely to be, at the place of observation; 2·0 when the absorption seems double this, and so on proportionately, there being no superior limit to the scale. The average absorption in magnitude corresponding to the relative absorption is taken from tables computed from observations made since 1884; but if special observations were made on any particular night for the purpose of obtaining the absorption, a certain amount of weight is given them for modifying the average. Column 4 gives the magnitude calculated as equivalent to a difference of 1 step in

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brightness. The other columns, with the exception of the last, which is reserved for "Remarks," give the resulting zenithal magnitudes of the stars, computed from the magnitudes in the top line according to their observed relative brightness. The method of comparison is that of Argelander, namely, by "step estimations." The computations are made so as to satisfy the conditions that, while the calculated differences between the stars in the sequence observed are directly proportional to the number of steps between them, the average magnitude of the stars observed at one time, excluding the variable star, or stars, is kept the same as the average of the magnitudes given at the top of the table for the same stars, and also that their average difference from the average is kept the same. The magnitude of *α Orionis* is shown in two columns, those in italics being calculated from the comparison with *Procyon* and *α Tauri* only, both or either, these being likely to give the most correct results, as each additional star in the computation is likely to introduce a fresh personal equation. Magnitudes in parentheses are the assumed magnitudes, and are so given when there are no data for computation. When *α Orionis* is compared with one star only, the step value is assumed, and taken as equal 0·1 mag.

β Orionis was observed, but is not included in the computations on account of its suspected variability.

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Observations of the Brightness of

Assumed Magnitudes.— Date.	Time.	Absn.	Step Value.	0·18 α Aurigæ.	0·19 Vega.	R 0·25 α Boötis.	0·46 Procyon.
1895.	h m						
Jan. 18	9 18	1·1	·065	...	...	...	0·56
18	11 8	1·1	·063	...	...	...	(0·46)
30	8 30	1·0	...	...	...	...	(0·46)
30	10 52½	1·0	·094	...	...	0·22	0·45
Feb. 4	10 18¾	1·0	...	...	...	(0·25)	...
12	9 20	2·0	·060	...	...	...	(0·46)
At Tyne Dock Mar. 13	8 50	1·6	·115	...	...	...	(0·46)
16	10 24	1·6	·140	...	...	...	(0·46)
17	8 5	1·3	·090	...	...	...	...
21	9 43	1·0	·088	...	...	...	0·48
24	8 55	1·0	·092	...	...	...	0·48
Oct. 28	16 35	2·0	·112	...	...	...	(0·46)
At Great Ayton, Yorkshire, Nov. 16	10 28	1·0	·070	...	...	...	0·41
Dec. 11	12 55	1·4	·117	...	...	...	0·47
13	15 35¾	1·5	·111	...	...	...	(0·46)
1896.							
Jan. 12	8 45	1·05	·071	...	...	...	0·63
15	12 22	1·0	·089	...	...	...	0·46
Mar. 1	8 35	1·0	·127	...	...	...	(0.46)
6	9 22	1·0	·112	...	...	...	(0·46)
16	8 0	1·0	·109	...	...	...	(0·46)
Oct. 8	11 30	1·1	...	...	...	...	...
8	11 43¼	1·1	·100	...	...	...	...
8	11 55$\frac{1}{12}$	1·1	·134	...	...	...	...
Nov. 8	16 45	1·3	·124	...	...	...	0·46
13	16 16	1·4	·116	...	...	...	(0·46)
14	16 15	1·2	·098	...	...	...	0·40
29	9 58	1·05	·091	...	(0·19)	...	...
29	12 10	1·05	·103	0·19	...	...	0·44
29	14 15	1·05	·088	0·21	...	...	0·42
30	9 57	1·3	·150	(0·18)	(0·19)	...	...

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α Orionis, 1895–1898.

R α Orionis.		R 1·22 α Tauri.	R 1·34 β Gem.	1·56 α Gem.	1·90 β Tauri.	1·86 γ Orionis.	Remarks.
0·81	*0·82*	1·09	1·35	1·60	1·76	1·94	
..	*0·89*	(1·22)	...	...	...	...	
...	*0·93*	...	...	...	...	...	Step value assumed.
0·81	*0·88*	1·09	1·50	...	...	...	*α* Boötis low down.
1·37	...	...	...	...	...	...	Moonlight. Observation made with spectacles. *α* Boötis low down. Stars apparently equal.
...	*1·03*	(1·22)	...	...	...	...	
...	*1·19*	(1·22)	...	...	...	...	
...	*1·28*	(1·22)	...	...	...	...	
0·96	*1·12*	(1.22)	(1·34)	...	...	...	
1·24	*1·17*	1·30	1·33	1·60	1·79	...	
1·11	*1·08*	1·26	1·33	1·62	1·81	...	
...	*0·70*	(1·22)	...	...	...	...	
0·82	*0·80*	1·21	1·41	...	...	...	Procyon low down.
0·75	*0·77*	1·14	1·43	...	...	...	
...	*0·86*	(1·22)	...	...	...	...	
0·81	*0·71*	1·14	1·45	1·66	1·78	...	
0·92	*0·84*	1·39	...	...	1·73	...	
...	*0·70*	(1·22)	...	...	...	...	
...	*0·76*	(1·22)	...	...	...	...	
...	*0·79*	(1·22)	...	...	...	...	
...	*0·62*	(1·22)	...	...	...	...	Step value assumed.
0·80	*0·80*	(1·22)	...	...	(1·90)	...	
0·58	*0·61*	(1·22)	...	...	(1·90)	...	
0·73	*0·74*	1·21	...	...	1·72	2·03	
...	*0·65*	(1·22)	...	...	...	...	
0·56	*0·62*	1·14	1·50	1·76	1·66	1·88	
0·71	...	(1·22)	...	...	...	...	
0·46	*0·45*	1·10	1·45	...	...	...	
0·61	*0·69*	1·06	1·50	...	...	...	
0·91	...	...	...	...	...	...	

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Assumed Magnitudes.— Date.	Time. h	 m	Absn.	Step Value.	0·18 α Aurigæ.	0·19 Vega.	R 0·25 α Boötis.	0·46 Procyon.
1896.								
Dec. 11	13	40	1·2	·087	0·17	...	...	0·47
28	12	25	1·2	·099	...	...	...	(0·46)
1897.								
Jan. 1	12	32	1·1	·075	...	...	−0·64	0·50
25	9	45	1·05	·079	...	...	...	0·46
Feb. 24	7	45	1·0	·086	0·10	...	...	0·54
26	9	40	1·2	·093	...	...	0·20	0·50
Mar. 18	8	50	1·0	...	...	...	...	...
At Northallerton, Mar. 29	8	26	1·1	·091	0·15	...	0·23	0·54
Oct. 10	11	12	1·0	...	...	...	...	...
Nov. 19	16	22	1·0	·130	...	...	...	(0·46)
1898.								
Sept. 23	14	50	1·0	·144	...	...	...	...
Oct. 24	17	15	1·0	·127	...	...	...	(0·46)
Nov. 16	17	7	1·0	·120	...	...	...	(0·46)
21	16	30	1·2	·056	0·00	...	...	0·84
Dec. 7	14	5	1·0	·076	−0·04	...	...	0·71
11	11	5	1·1	·038	0·19	...	...	0·66
12	12	5	1·2	·077	...	...	...	0·57

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R α Orionis.		R 1·22 α Tauri.	R 1·34 β Gem.	1·56 α Gem.	1·90 β Tauri.	1·86 γ Orionis.	Remarks.
0·73	*0·74*	1·17	1·37	1·64	1·79	1·90	
...	*0·76*	(1·22)	...	...	...	...	
0·72	*0·71*	1·17	1·41	1·72	1·68	...	α Boötis not used in computation.
0·83	*0·87*	1·14	1·42	...	...	...	
0·84	*0·88*	1·22	...	...	...	...	
0·82	*0·65*	1·13	1·46	1·75	1·69	...	
...	*0·82*	(1·22)	...	...	...	...	Moonlight. Step value assumed.
0·89	*0·81*	1·30	1·39	1·63	1·70	...	
...	*0·44*	(1·22)	...	...	...	...	Bright moonlight. Stars apparently equal.
...	*0·67*	(1·22)	...	...	...	...	Very slight moonlight.
1·35	*1·05*	(1·22)	...	...	(1·90)	...	
...	*0·96*	(1·22)	...	...	...	...	Slight twilight.
...	*1·07*	(1·22)	...	...	...	...	
1·21	*1·05*	1·31	1·48	1·63	1·55	...	Sirius = −1·56.
1·00	*1·06*	1·09	1·43	1·63	1·79	...	α Leonis = 1·50.
0·90	*0·92*	1·03	...	...	...	...	
0·97	*1·05*	1·10	1·43	1·68	1·69	...	